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Monitoring sub-seafloor deformation in plate subduction zone

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Fault rupture in a subduction zone often causes devastating earthquake and tsunami hazards. Therefore, understanding a slip behavior along the fault is a crucial scientific topic and a deeply socially relevant problem. To understand the slip behavior along the fault, there are two kinds of essential geophysical datasets. One is seafloor displacement as a surface response of a fault slip, and the other is the sub-seafloor structure, which is needed to transform a surface displacement to a fault displacement. Recent studies reveal that surface displacements due to fault slips show a wide-spectrum of their frequency, from a regular earthquake (~10 Hz) to a long-term slow slip (~months). To monitor the entire spectrum of the fault slip, monitoring the displacement with a seismo-geodetic band in real-time continuously is necessary. And also, to transform the displacement to the slip along the fault, it is essential to know a realistic structure of a medium (lithospheric structure) in the subduction zone. JAMSTEC is conducting an integrated geophysical project to establish a real-time continuous seafloor geodetic network in the Nankai Trough, Japan, and construct a three-dimensional structural model using seismic data. We will present an outline and recent results of the project in this presentation.

Promotional text

The sensing and modeling the seafloor displacement can be utilize other kind of monitoring of signal propagating through the earth and/or the ocean, such as signals from Nuclear-Test-Ban

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